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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,907	08/09/2005	Thomas Paddock	ARCU-084-101	8733

28120   7590   12/08/2009
ROPES & GRAY LLP
PATENT DOCKETING 39/41
ONE INTERNATIONAL PLACE
BOSTON, MA 02110-2624

EXAMINER
SAUNDERS JR, JOSEPH

ART UNIT	PAPER NUMBER
2614	

MAIL DATE	DELIVERY MODE
12/08/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

		Application No.	Applicant(s)
Office Action Summary		10/516,907	PADDOCK ET AL.
		Examiner	Art Unit	
		Joseph Saunders	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>18 August 2009</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>5,7,10,11,15,17,18,27 and 32</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>5,7,10,11,15,17,18,27 and 32</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>03 December 2004</u> is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>8-18-09 and 10-8-09</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail. Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This office action is in response to the communications filed August 18, 2009.

Claims 6, 7, 10, 11, 15, 17, 18, 27, and 32 are currently pending and considered below.

Response to Arguments

2.   Applicant's arguments with respect to independent claims 6, 15, 18, and 27

regarding, "Claesson fails to show or suggest processing a full bandwidth component

signal, a bass component signal, a midrange component signal, and treble component

signal in distinct processing pathways. Instead, Claesson only shows processing a full

bandwidth component signal, a low frequency component signal, and a high frequency

component signal. Applicants further submit that FIG. 10a of Claesson shows a system

that processes the audio signal in parallel paths using a low pass and high pass filter,

and does not produce or process a midrange component of the audio signal. At best,

Claesson shows processing a bass and treble component signal, and does not process

the midrange component signal in a distinct pathway, as required by applicants' claims,"

page 9 of remarks, have been considered but are moot in view of the new ground(s) of

rejection.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains.
Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 6, 7, 10, 11, 15, 17, and 18 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Claesson et al. (2002/0075965 A1), hereinafter <u>Claesson</u>.

Claim 6: <u>Claesson</u> discloses a method for enhancing audio signals ("Digital Signal

Processing Techniques for Improving Audio Clarity and Intelligibility"), comprising:

receiving an audio signal ("in", Figure 10a); separating the audio signal into component

signals corresponding to discrete bands ("Indeed, as can be seen in FIG. 10a, the input

samples are pre-processed in one of four parallel paths," [0075]); processing one or

more of the component signals with distinct processing pathways, resulting in

processed component signals (AGC and SP. AGC, Figure 10a); aggregating the

processed component signals to recreate a standard signal in one or more channels ("It

should also be noted that, with some exceptions noted below, the processing blocks of

processor 1000 operate in a similar manner to the corresponding blocks of processors

30 and 900 described above," [0075] and therefore a mixer similar to Mixer 42 of

processor 30 would be responsible for the combined signal entering block "To

crossovers" of Figure 10a. resulting in the Pre-processed audio, Figure 10b); and

performing additional post-processing (Figure 10b) on the standard signal to mask

artifacts and response anomalies introduced by a codec and equipment used, resulting

in an enhanced audio signal ("As the bandwidth of encoders are reduced relative to the

bandwidth of the original audio, undesirable audible artifacts are generated. The

present invention processes the audio samples such that these anticipated artifacts

become less noticeable to the human ear. That is, the signal processing of the present

invention allows a low bit rate encoder to be used to encode an audio stream without

suffering overly much from the undesirable artifacts created by trying to faithfully

reproduce a high bandwidth signal (the original audio) with a low bandwidth system (the

low bit rate codec). In addition to facilitating the bandwidth savings represented by low

bit rate encoders, the signal processing of the present invention may have other

desirable effects such as, for example, the improvement of clarity in the presence of

background noise and cut-to-cut evenness," [0058] – [0059]).

Further, while Claesson discloses separating the audio signal into distinct

processing pathways of a full bandwidth component signal ("wideband," Figure 10a) and

a bass component signal, and a treble component signal (LP and HP signal via 2-way

crossover 200hz, Figure 10a) and processing the components within the respective

pathways (AGC, SP.AGC). Claesson does not explicitly disclose the claimed

"midrange" processing pathway. Claesson, however, does state, "It should be noted

that signal processing software 140 may employ a greater or fewer number of frequency

bands and processing blocks than various ones of the embodiments described herein.

That is, for different applications, a greater or lesser amount of processing resources

are available to effect the signal processing techniques of the present invention. For

example, the available number of processing cycles in a small portable playback device

such as an MP3 player may be limited. By contrast, such limitations may not exist for

an audio server such as server 106 of FIG. 6," [0053]. Claesson also states, "Because

the samples are divided into multiple frequency bands, the volume in each frequency

band may be equalized separately and independently from the other frequency bands.
Independent processing of each frequency band is desirable where there is a
combination of high-pitch, low-pitch and medium-pitch instruments playing
simultaneously," [0034]. Therefore while the processing stage of Claesson only
discloses a 2-way crossover, it would have been obvious to one of ordinary skill in the
art at the time of the invention given the aforementioned remarks by Claesson separate
the signal into more than 2 pathways thereby including a midrange processing pathway
in the invention of Claesson, thus allowing for desirable independent processing for
high-pitch, low-pitch and medium-pitch instruments.

Claim 7: Claesson discloses a method according to claim 6, wherein the audio signal is
a compressed audio signal ("MP3 encoding scheme," [0049]).

Claim 10: Claesson discloses a method according to claim 6, wherein the post-
processing comprises at least one of: 3D/live enhancement for adding life and stereo
perspective to the sound field of the enhanced audio signal; recording environment
simulation for adding diffusion, reverb, depth, regeneration, and room decay to the
enhanced audio signal; voice elimination for reducing vocals in the enhanced audio
signal; wide stereo enhancement for adding wider stereo perspective to the sound field
of the enhanced audio signal; parametric equalization for providing broad spectrum
shaping of the enhanced audio signal; filtering the enhanced audio signal to reinforce
subwoofer and bass frequencies; wall simulation for producing time delays that simulate

reflections from a stage; room simulation for producing time delays that simulate natural

room acoustics; karaoke enhancement for removing equal energy components from left

and right signal channels; vocal enhancement for clarifying vocal features; subsonic

enhancement for low-bass reinforcement of the enhanced audio signal; and look-ahead

automatic gain control for controlling output dynamic range ("To deal with this, NATLs

1080-1084 look at future samples and limit the gain of the current sample to avoid the

distortion associated with such sharp overshoots," [0080]).

Claim 11: Claesson discloses a method according to claim 6, wherein the post-

processing includes room simulation for compensating for poor room acoustics in a

listening environment for the enhanced audio signal ("For example, playback device 130

might be part of an audio system located inside a user's car, the dynamic processing

capabilities of the invention being employed to improve the quality of sound in the

presence of the background noise typical in such an environment," [0051]).

Claim 15 is substantially similar in scope to claim 6 and therefore is rejected for the

same reasons (see also, Claesson discloses a system for enhancing audio signals

(Figures 12a, 12b, and 14).

Claim 17 is substantially similar in scope to claim 10 and therefore is rejected for the

same reasons.

Claim 18 is substantially similar in scope to claim 6 and therefore is rejected for the
same reasons (see also, <u>Claesson</u> discloses an apparatus for playback of digital audio
files (Figures 12a, 12b, and 14).

5.   Claims 27 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable
over <u>Claesson</u> in view of Anderson (US 4,396,806), hereinafter <u>Anderson</u>.

Claim 27: <u>Claesson</u> discloses a system for enhancing audio signals ("Digital Signal
Processing Techniques for Improving Audio Clarity and Intelligibility"), comprising: a full
bandwidth pathway for processing a full bandwidth component of an audio signal
("wideband," Figure 10a), the full bandwidth pathway producing a processed full
bandwidth signal (via SP. AGC), at least one limited bandwidth pathway for processing
a limited bandwidth component of the audio signal (LP and HP signal via 2-way
crossover 200hz, Figure 10a), the limited bandwidth pathway producing a processed
limited bandwidth signal (via AGC and SP. AGC, Figure 10a), and a mixer configured to
combine the processed full bandwidth signal and the processed limited bandwidth
signal to create a mixed audio signal ("It should also be noted that, with some
exceptions noted below, the processing blocks of processor 1000 operate in a similar
manner to the corresponding blocks of processors 30 and 900 described above," [0075]
and therefore a mixer similar to Mixer 42 of processor 30 would be responsible for the
combined signal entering block "To crossovers" of Figure 10a. resulting in the Pre-
processed audio, Figure 10b).

Claesson does not disclose the full bandwidth pathway comprising: a first input
amplifier having an input for the audio signal, a first output amplifier having an output for
the processed full bandwidth signal, and a first compressor connected between the first
input amplifier and the first output amplifier; and further does not disclose the at least
one limited bandwidth pathway comprising: a second input amplifier having an input for
the audio signal, a second output amplifier having an output for the processed limited
bandwidth signal, a second compressor connected between the second input amplifier
and the second output amplifier, and a filter connected between the second input
amplifier and the second output amplifier. Claesson does state, "A generalized topology
of the present invention includes three different kinds of blocks, AGCs (including
NATLs), drive blocks (e.g., drive blocks 46, 50 and 54 of FIG. 1b), and filter blocks (e.g.,
crossovers 36 and 44 of FIG. 1a). Signal processing networks combining these three
elements in any of a wide variety of ways are considered within the scope of the
invention. As described above, filter or crossover blocks typically are employed to
perform a series of linear operations to separate signals into overlapping frequency
bands," [0060]. Anderson discloses an audio signal processing topology similarly
comprising voltage-controlled amplifiers, filtered channels, and compressors for
improving sound characteristics, and therefore within the scope of Claesson's invention.
Anderson specifically teaches an input signal is processed in parallel channels, "Each
channel comprises, in order, a first voltage-controlled amplifier 80, a bandpass filter 82
centered at the channel frequency, which may be for example 100 to 200 Hz first
channel 26 with a center frequency at 150, and 200 to 400 Hz in second channel 27

with the center frequency at 300 Hz. Thereafter, the channel includes a voltage-controlled limiter or compressor 84 followed by a second bandpass filter 86 which in turn is followed by a second voltage-controlled amplifier 88. The outputs of the second voltage controlled amplifier 88 are mixed into a single channel, for example, at the input to a buffer amplifier 90, and fed through an output line 56 to the output amplifier 14 and thereafter to a speaker 16," Column 5 Lines 1 – 13 and Figure 3.

Anderson goes on to explain the advantages of this particular order, "Of particular interest is the order of the circuit elements in the channels 26, 27. The first voltage-controlled amplifier 80 is operative to amplify all applied signals to a level which will characterize the channel. The bandpass filter 82 which characterizes the channel passes only those frequencies within the defined channel range and attenuates all other signals, including any distorted signals introduced by the amplifier 80 outside the channel spectrum. The output of the bandpass filter 82 is coupled to the voltage-controlled compressor 84. The compressor 84 provides the amplitude limiting function for the channel, thus minimizing the possibility that amplified sounds will cause pain to the user. The output of the compressor 84 is applied to a bandpass filter 86 which is of substantially the same design as the first bandpass filter 82 in its response characteristic to eliminate harmonic distortion or undesired effects caused by the voltage-controlled compressor 84. The output of the bandpass filter 86 is then applied to the input of a second voltage-controlled amplifier 88. The voltage-controlled amplifier 88 permits the final selection of the audio sound level in the spectrum of the channel

best suited to the taste of the user. The output of the second voltage-controlled

amplifier 88 is thereafter mixed with the outputs of all other channels.

In summary, the first amplifier 80 provides initial amplitude adjustment to match

the characteristics of the compressor so that all input signals within the selected range

of the channel are within the audio range of the listener, the second amplifier 88

provides fine control of amplitude, and the bandpass filters 82 and 86 characterize the

channel. The placement of the bandpass filters 82 and 86 are selected to minimize

noise caused by distortion. The levels and amplitudes of the amplifiers 80 and 88 and

the compressor 84 are controlled by a voltage level," Column 5 Lines 14 - 49.

Therefore given the similarity between the processing technique disclosed by

Claesson and Anderson, it would have been obvious to one of ordinary skill in the art at

the time of the invention to include the processing blocks in order as disclosed by

Anderson, in the parallel processing paths disclosed by Claesson, i.e., the wideband

and band limited paths, thereby allowing for the aforementioned advantages disclosed

by Anderson, resulting in improved sound characteristics.

Further, while Claesson and Anderson disclose separating the audio signal into

distinct processing pathways of a full bandwidth component signal ("wideband," Figure

10a) and a bass component signal, and a treble component signal (LP and HP signal

via 2-way crossover 200hz, Figure 10a) and processing the components within the

respective pathways (AGC, SP.AGC). Claesson does not explicitly disclose the claimed

"midrange" processing pathway. Claesson, however, does state, "It should be noted

that signal processing software 140 may employ a greater or fewer number of frequency

bands and processing blocks than various ones of the embodiments described herein.

That is, for different applications, a greater or lesser amount of processing resources

are available to effect the signal processing techniques of the present invention. For

example, the available number of processing cycles in a small portable playback device

such as an MP3 player may be limited. By contrast, such limitations may not exist for

an audio server such as server 106 of FIG. 6," [0053]. Claesson also states, "Because

the samples are divided into multiple frequency bands, the volume in each frequency

band may be equalized separately and independently from the other frequency bands.

Independent processing of each frequency band is desirable where there is a

combination of high-pitch, low-pitch and medium-pitch instruments playing

simultaneously," [0034]. Therefore while the processing stage of Claesson and

Anderson only discloses a 2-way crossover, it would have been obvious to one of

ordinary skill in the art at the time of the invention given the aforementioned remarks by

Claesson separate the signal into more than 2 pathways thereby including a midrange

processing pathway in the invention of Claesson and Anderson and further applying the

teachings of Anderson to the midrange pathway for the aforementioned reasons as well,

thus allowing for desirable independent processing for high-pitch, low-pitch and

medium-pitch instruments.

Claim 32: Claesson and Anderson disclose a system according to claim 27, further

comprising a pre-compressor configured to receive an input audio signal and to

generate the audio signal as a compressed representation of the input audio signal

(Figure 10 b of <u>Claesson</u> illustrates a pre-compressor or NATLs 1 – 5 performing pre-compression on the input audio signal before mixing and subsequent compression from NATL 1092).

Conclusion

6.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Saunders whose telephone number is (571) 270-1063. The examiner can normally be reached on Monday - Thursday, 9:00 a.m. - 4:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. S./
Examiner, Art Unit 2614

/Vivian Chin/
Supervisory Patent Examiner, Art Unit 2614